

**REMARKS**

The examiner is thanked for the Official Action mailed October 21, 2003. This amendment and request for reconsideration is intended to be fully responsive to the Official Action.

In the Official Action, the examiner rejected claims 1-4, 6-11, and 13-23 under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 98/37032 to Symons, in view of U.S. Patent 4,748,771 to Lehnert. Claims 5 and 12 are rejected over Symons in view of Lehnert and further in view of U.S. Patent 3,793,134 to Hardy. Claims 24 and 25 were rejected under 103(a) as being unpatentable over U.S. Patent 4,746,555 to Luckanuck in view of U.S. Patent 5,358,676 to Jennings. Claims 26 and 27 were rejected under 35 U.S.C. 103(a) over Luckanuck in view of Jennings. Claim 28 was rejected under 35 U.S.C. 103(a) over Symons in view of Lehnert. Claim 29 was rejected under 35 U.S.C. 103(a) over Symons in view of U.S. Patent 4,191,677 to Wehrmann.

With regard to claims 1-23, Symons teaches a process that may include exfoliated vermiculite for forming interior building boards, however, there is no indication that the boards have the properties required to comprise a satisfactory fire retardant core of a fire door, as defined at the bottom of page 2 and on page 3 of the current specification. To address this deficiency, the examiner proposes to combine the process taught by Symons with the fire door core disclosed by Lehnert. The examiner

indicates that it would be *prima facie* obvious to use the molding techniques of Symons to produce the fire door components taught by Lehnert. However, the fire door core component materials disclosed by Lehnert are not claimed in claim 1. Even if the Symons process could be successfully used on the fire retardant materials comprising the Lehnert core, the result would not address the claimed subject matter. Specifically, Lehnert does not disclose the use of exfoliated vermiculite in the core, as specifically claimed in claim 1. Instead, Lehnert teaches a fire door core with no exfoliated vermiculite and only trace amounts (0-4% by weight) of raw (unexpanded) vermiculite, as indicated in Lehnert column 3, line 35. The properties of exfoliated vermiculite are significantly different from the properties of unexpanded vermiculite, as indicated on page 26, lines 7-12 of the current specification.

Additionally, Symons does not teach a method of forming a fire door core. Further, Symons does not teach that the Symons materials could be manipulated to fabricate a satisfactory fire retardant fire door core, as defined at the bottom of page 2 and on page 3 of the current specification.

Although Lehnert teaches a fire door core, the core disclosed in Lehnert contains no exfoliated vermiculite, as claimed in claim 1. It is not clear whether the fire retardant core materials disclosed in Lehnert column 3, lines 30-37 could be successfully formed into a fire door core by the process disclosed in Symons. However, even if the fire retardant materials disclosed by Lehnert could be reformed by the

Symons process, the resulting door would not meet the limitations of claim 1 because the Lehnert materials do not include exfoliated vermiculite.

The examiner indicates that one would have been motivated to use the molding techniques of Symons to produce the door components taught by Lehnert "to provide door components that not only have the desired integrity and machinability of traditional door components, but that are also characterized by their ability to retain strength . . . ", as indicated in Lehnert Column 2, lines 14-18. Significantly, this reference refers to the Lehnert edge banding configuration rather than the door core. As indicated in column 7, lines 55-57, the edge banding refers to the components forming the door stiles. As further indicated in column 8, lines 7-13, the stiles are comprised of a relatively thin untreated wood strip W, a gypsum composition strip G, and an intervening plastic laminate strip L, shown in Lehnert Figure 3. However, none of these components can be manufactured by the Symons process. Further, the door stiles are not claimed in claim 1 of the present invention - only the door core (shown as C in Lehnert Figure 3) is claimed in claim 1. Clearly, the motivational statement given by the examiner applies to the door banding (i.e. the door stiles) rather than the door core, as claimed in claim 1.

Also with regard to claims 1, 6, and 11, neither Symons nor Lehnert discloses the limitation that the mold temperature is controlled (maintained below the resin reaction temperature) after the mixed ingredients have been placed into the mold and before the pressing stage is initiated. The temperature of the mold during this stage may

be manipulated to control the properties of the resulting product. Although strict control of product properties may not be essential when using the Symons process to manufacture boards, control of the product properties is essential to ensure the fire retardant capabilities of the core of a fire door. In the current process, the molds are pre-heated and may be cooled if required, but the mold temperature is maintained below the resin reaction temperature. Because the properties of the exfoliated vermiculite mixture may be manipulated by controlling the mold temperature, it would not be obvious to maintain the mold below the resin reaction temperature, as specifically claimed in claims 1, 6 and 11.

Similarly with regard to claim 1, the Symons process does not disclose depositing the exfoliated vermiculite mixture into a mold and then transferring the mold to a heated press, as claimed in claim 1 and disclosed in Figures 1 and 2 of the current invention. The current invention is a sequential manufacturing process designed to produce a fire door core. Symons merely describes ways in which various feedstocks can be combined with binders and resins to produce composite products, usually boards. Symons does not describe a process whereby an exfoliated vermiculite mixture is deposited in a mold, and the mold is then transferred to a heated press, as claimed in claim 1 of the current invention.

With regard to the mixing limitations of claims 2 and 4, the examiner cites steps 3-5 of Symons Example 1 to indicate that the binder and the resin are mixed separately from the reprocessed paper sludge feedstock prior to the heating and pressing stage.

However, none of the Symons examples (including Example 1) uses exfoliated vermiculite as a mixture ingredient, and consequently the examples do not disclose the claimed limitation as applied to an exfoliated vermiculite mixture. Exfoliated vermiculite is specifically claimed in claim 1 of the present invention. In accordance with MPEP 2143.03, to establish a prima facie case of obviousness, all claimed limitations must be taught or suggested by the prior art.

With regard to claim 17, the examiner is requested to give some evidence that the moisture content of a fire door core is a “result effective variable as recognized by Symons in view of Lehnert” and some evidence that the optimal final moisture content would be obvious through “routine experimentation”. On the contrary, the moisture content of the fire door core is an important aspect of its construction and the result of extensive experimentation (See Table 1 on page 32 of the specification). As indicated on page 25, second paragraph, the final moisture content of 10-14% is designed to yield a crystalline water hydration content of about 6.6%. As indicated on page 9, second paragraph, the chemically bound (crystalline) water provides an important insulative cooling effect to the fire door core.

Claim 23 was not specifically addressed in the Office Action. Claim 23 claims that the produced slab has a density from about 350 kg/m<sup>3</sup> to 600 kg/m<sup>3</sup>. On page 11, first paragraph, Symons indicates that the density of an exfoliated vermiculite product may be reduced “as low as 850 kg/m<sup>3</sup>”. However, Symons does not disclose the production of low density vermiculite products in the claimed range.

For the foregoing reasons, it is respectfully submitted that claims 1-23 are in condition for allowance.

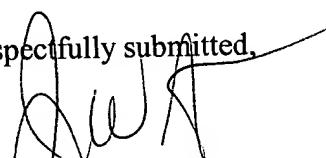
With regard to claims 24 and 25, claim 24 has been amended to indicate that a submixture comprising resin and hydraulic binder is first created and then exfoliated vermiculite is added to the submixture to create a final mixture. Neither Luckanuck nor Jennings discloses a system that includes creating a submixture comprising resin and hydraulic binder, and a final mixture in which exfoliated vermiculite is added to the submixture. It is submitted that the amendment places claim 24 in condition for allowance. Since claim 25 is dependent on claim 24, it is respectfully submitted that claims 24 and 25 are in condition for allowance.

With regard to claims 26-29, claim 26 has been amended to indicate that the density of the produced hardened slab is 350-800 kg/m<sup>3</sup>. At the bottom of page 7 and the top of page 8, the current specification indicates that low density exfoliated vermiculite slabs exhibit satisfactory fire and heat resistant properties while being less costly manufacture. On page 11, first paragraph, Symons indicates that the density of an exfoliated vermiculite product produced by the method disclosed in Symons may be “as low as 850 kg/m<sup>3</sup>”. On page 22, first paragraph, Symons also indicates that, by using exfoliated vermiculite “densities may be reduced 700 kg/m<sup>3</sup>”. Read together, these references clearly mean that by using exfoliated vermiculite, densities may be reduced by 700 kg/m<sup>3</sup> to a density possibly as low as 850 kg/m<sup>3</sup>. Therefore, Symons

does not disclose a method of producing an exfoliated vermiculite slab having a density of 350-800 kg/m<sup>3</sup>, as specifically claimed in amended claim 26. For the foregoing reasons amended independent claim 26 is in condition for allowance. Since claims 27-29 are dependent on claim 26, it is respectfully submitted claims 26-29 are in condition for allowance.

New dependent claims 30-32 have been added to further distinguish the invention over the prior art. Support for claims 30-31 is found in the current specification on page 14, first paragraph, and support for claim 32 is found at the bottom of page 7 of the specification.

It is respectfully submitted that the above amendments and comments resolve all outstanding issues and place this application in condition for allowance. Should the examiner believe that additional discussion would advance the prosecution of the present invention, he is encouraged to contact the undersigned at the phone number listed below. The additional charge for the three dependent claims has been submitted concurrent with this amendment. Should any other charges be due, then please debit deposit Account 50-0548 and notify the undersigned.

Respectfully submitted,  


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